CLAIMS

1. A method of producing cerium oxide particles by raising a temperature of a cerium compound from a normal temperature and heating the cerium compound to a temperature range of 400°C to 1200°C, in which the method comprises at least a temperature raising stage of a temperature rise speed of 2°C/hour to 60°C/hour.

2. The production method for cerium oxide particles according to claim 1, wherein the temperature raising stage of the temperature rise speed of 2°C/hour to 60°C/hour is a first temperature raising stage that is continued until the temperature reaches a temperature range of 200°C to 350°C after rising from the normal temperature.

3. The production method for cerium oxide particles according to claim 2, wherein after the first temperature raising stage, heating is performed up to the temperature range of 400°C to 1200°C in a second temperature raising stage of a temperature rise speed of 2°C/hour to 200°C/hour.

4. The production method for cerium oxide particles according to any one of claims 1 to 3, wherein after the temperature reaches the temperature range of 400°C to 1200°C, the temperature is maintained for 10 minutes to 240 hours.

5. A cerium oxide powder made of cerium oxide particles produced in a ceramics-made container based on the method according to any one of claims 1 to 4, in which a difference in BET method-converted particle diameter converted from a specific surface area value obtained through a BET method between cerium oxide particles of a surface layer portion and an internal portion of the powder within the container is within 20% of an average value of BET method-converted particle diameters of cerium oxide particles of the entire powder within the container.

6. A cerium oxide powder made of cerium oxide particles produced in plural ceramics-made containers based on the method according to any one of claims 1 to 4, in which a standard deviation of BET method-converted particle diameters converted from specific surface area values obtained through a BET method, and an average value of the BET method-converted particle diameters are such that the value calculated through the

following expression I:

$$[(\text{standard deviation})/(\text{average value})] \times 100 \quad (I)$$

in the expression, (standard deviation) represents a standard deviation of BET method-converted particle diameters, and (average value) represents an average value of BET method-converted particle diameters,
is within a range of 3 and 10.

7. A method of producing cerium oxide particles by raising a temperature of a cerium compound from a normal temperature and heating the cerium compound to a temperature range of 400°C to 1200°C, in which the method proceeds via a stage of heating while supplying a humidified gas in a temperature raising process.

8. The production method for cerium oxide particles according to claim 7, wherein a water vapor in the humidified gas has a value of 0.5 to 0.8 in a partial pressure ratio calculated through the following expression II:

$$H_2O_p/(H_2O_p + gas_p) \quad (II)$$

in the expression, H_2O_p represents the partial pressure of water vapor, and gas_p represents the partial pressure of the gas.

9. The production method for cerium oxide particles according to claim 7 or 8, wherein the gas is an oxygen gas, a mixture gas of oxygen and nitrogen, or an air.

10. The production method for cerium oxide particles according to any one of claims 7 to 9, wherein supply of the humidified gas is started at a temperature of 100°C or higher, and is continued until a temperature range of 200°C to 350°C is reached.

11. The production method for cerium oxide particles according to any one of claims 7 to 10, wherein the cerium compound is a cerium carbonate hydrate.

12. A cerium oxide powder made of cerium oxide particles produced in an atmosphere adjustment type calcining furnace based on the method according any one of claims 7 to 11, in which values of particle diameters of the powder measured through a laser diffraction method become 0.1 to 0.3 as a ratio value calculated through the following expression III:

$(D_{50} - D_{10})/(D_{90} - D_{50})$ (III)

in the expression,

D_{10} represents a particle diameter that means that the number of particles of this particle diameter or less is 10% of the total number of particles,

D_{50} represents a particle diameter that means that the number of particles of this particle diameter or less is 50% of the total number of particles, and

D_{90} represents a particle diameter that means that the number of particles of this particle diameter or less is 90% of the total number of particles.

13. An aqueous cerium oxide slurry for use for the polishing of a substrate whose main component is silica, which contains cerium oxide particles produced by the method according to any one of claims 1 to 4 and claims 7 to 11.

14. The aqueous cerium oxide slurry according to claim 13, wherein the polishing of the substrate whose main component is silica is the polishing of a rock crystal, a photomask-purpose quartz glass, an organic film for a semiconductor device, a low-dielectric constant film for a semiconductor device, an inter-layer insulator film for a semiconductor device, trench isolation for a semiconductor device, or a glass-made hard disk substrate.